Memorandum

1/4/77

To: The Commission

From: JLS

RE: Copyrightability of Computer Software

I. Introduction

The subject of copyright protection for computer software is prominent among the topics considered during the first year of the Commission's activities, and several alternatives for Commission action with regard to computer software have been recently discussed. Recommendations have been made for various modifications of the recently enacted Copyright Revision Bill to specify or clarify the type and amount of protection accorded to computer software by copyright, based on the premise that such works are entitled to copyright protection under the Revision Bill, and that such protection is warranted by consideration of the proprietary needs of software developers and the public interest in access to an increased production and quality of software. A staff memorandum is presently being prepared which presents an analysis of evidence available to the Commission from which any conclusion about the social utility of copyright protection for software must stem. The instant paper is directed solely to the issue of whether, and in what form, computer software constitutes copyrightable subject matter. It is the purpose of this paper to present an argument that computer software, in the form which is placed in a computer to directly control its operation, is not copyrightable subject matter.[1/]

1/ This paper has been prepared to present the view that computer programs are not copyrightable. This does not necessarily represent an agreed position of the staff.

Because there may be some confusion as to the precise meaning of computer "software" and "programs", caused in part by the lack of precision given those terms by those involved in and writing about the software industry, definitions as used in this paper will be adopted. "Software" as used herein includes all material created and marketed by software manufacturers--flow charts, computer listings, other documentation, "source programs" written in high-level languages such as FORTRAN and COBOL, compiler programs which convert source programs into a mode, referred to as an object program, capable of operating a computer, and the object programs themselves. "Object program" here refers only to that component of software which interacts directly with the hardware elements of a computer. Such programs may exist in a variety of media, such as punch cards, magnetic tape or discs, semiconductor chips, or as a hardwired component of the computer.

It is not here contested that the documentation describing a computer program, or source programs written in a language akin to English, are copyrightable. Insofar as these items present written expression conveying intelligible information, in human or symbolic language, they would likely Ie proper subject matter of copyright.[2/] It is contended only that those "object programs" which directly interact with a machine, containing no intelligible communication capable of being perceived and comprehended in normal usage by human beings, do not satisfy the constitutional and statutory requirements of copyright.

2/ The constitutional and statutory requirements for copyright are satisfied by works conveying verbal or numerical information. See Nimmer on Copyright §13.1 (1976). A listing of a computer program's steps or any of the documentation accompanying computer software, presented in human language, diagrams, or some form of visually intelligible code explaining the contents of the program, would satisfy these requirements.

II. Constitutional Criteria for Copyright.

The Constitution provides that "The Congress shall have Power... to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."[3/] The recently enacted Copyright Revision (hereinafter referred to as the "Act of 1976") provides that copyright is available for "original works of authorship fixed in any tangible medium of expression... from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device."[4/] It is the thesis of this paper that proper application of constitutional standards precludes computer "object" programs from eligibility for copyright under any statutory formulation.

Few authoritative interpretations of the term "writings" exist. The Supreme Court has done little more than confirm the status of photographs,[5/] circus posters[6/] and phonograph records[7/] as "writings" eligible for copyright,

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3/ U.S. Const., art. I, sec. 8, cl. 8.

4/ §102, Act of Oct. 19, 1976, Pub. L. 94-553, 90 Stat. 2541 [hereinafter cited as "Act of 1976"].

5/ Burrow-Giles Litographic Co. v. Sarony, 111 U.S. 53 (1884).

6/ Bleistein v. Donaldson Litographing Co., 188 U.S. 239 (1903).

7/ Goldstein v. California, 412 U.S. 546 (1973).

and deny copyright to bookkeeping systems, as opposed to the form of expression used to describe such systems.[8/] The lower courts, which speak less authoritatively on the breadth of constitutional grants of power to Congress, have found works such as code books,[9/] lists of grouped letters,[10/] and machine-scored answer sheets accompanying standardized tests[11/] to be "writings" within the constitutional grasp. And the Copyright Office, while expressing doubt whether they do satisfy the Constitutional standard of writings, has accepted computer programs for copyright registration.[12/] In so doing, all have recognized certain hazy outlines of the field encompassed by the Constitution: "writings" may be conceptually defined as works of intellectual effort in which an originator gives visual or aural expression to his ideas.[13/]

8/ Baker v. Selden, 101 U.S. 99 (1879).

9/ Hartfield v. Peterson, 91 F. 2d 998 (2d Cir. 1937).

10/ Reiss v. National Quotation Bureau, 276 F. 717 (S.D.N.Y. 1921).

11/ Harcourt, Brace & World, Inc. v. Graphic Controls Corp., 329 F. Supp. 157 (S.D.N.Y. 1971).

12/ An announcement of Copyright Office decision to accept computer programs for registration was issued in 1964 and appeared at 11 Bull. Cr. Soc. 361, (1964), accompanied by an article explaining that computer programs would be accepted for registration in spite of doubt whether they were "within the category of a 'writing' of an author in the constitutional sense." Cary, "Copyright Registration and Computer Programs," 11 Bull. Cr. Soc. 362 (1964).

13/ In Burrow-Giles Lithographic Co. v. Sarony, 111 U.S. 53 (1884), holding photographs to be copyrightable, Mr. Justice Day defined writings as

> the literary productions of those authors, and Congress very properly has declared these to include all forms of writings...by which the ideas in the mind of the author are given visible expression. Id. at 58.

Commentators have recognized difficulties inherent in defining the ambit of the constitutional grant of copyright authority -- especially when media unknown and unforeseen by the founding fathers are employed to

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Justice Holmes adopted this reasoning in holding a decorative circus advertising poster to be copyrightable in Bleistein v. Donaldson Lithographing Co., 188 U.S. 239 (1903). And in Goldstein v. California, 412 U.S. 546 (1973), in which a state law criminalizing tape and record piracy, prior to the enactment of legislation recognizing federal copyright protection for sound recordings, was held valid, the Court stated that the Constitutional term "writings" was to be interpreted broadly, and could include sound recordings if Congress should choose.

> By Art. I, §8, cl. 8, of the Constitution, the States granted to Congress the power to protect the "Writings" of "Authors." These terms have not been construed in their narrow literal sense but, rather, with the reach necessary to reflect the broad scope of constitutional principles. While an "author" may be viewed as an individual who writes an original composition, the term, in its constitutional sense, has been construed to mean an "originator," "he to whom anything owes its origin." Burrow-Giles Lithographic Co. v. Sarony, 111 U.S. 53, 58 (1884). Similarly, although the word "writings" might be limited to script or printed material, it may be interpreted to include any physical rendering of the fruits of creative intellectual or aesthetic labor. Id. at 561-62.

It is generally recognized that the decision in Baker v. Selden, 101 U.S. 99 (1879) establishes limits to the expansive reading given the Constitutional clause, and that copyright affords no protection to utilitarian sytems described or embodied in a work:

> The description of the art in a book, though entitled to the benefit of copyright, lays no foundation for an exclusive claim to the art itself. The object of the one is explanation, the object of the other is use. The former may be secured by copyright. The latter can only be secured, if it can be secured at all, by letters-patent. Id. at 105.

express and convey an author's conception.[14] Interpretive aids contemporary with the Constitutional Convention are scant, and provide little meaningful guidance to the intended scope of "writings" in the Copyright and Patent Clause.[15] But the inclusion of maps and charts as works subject to copyright legislation[16] - enacted by a Congress which included many delegates to the Constitutional Convention - does support the inference that "writings" is not to be limited to its most narrow meaning. Certainly technological, as well as legislative and judicial developments since then, give support to a reading of the Constitutional grant of copyright authority to encompass works such as motion pictures[17] and phonograph records.[18] These are all works by which

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14/ See Subcommittee on Patents, Trademarks and Copyrights of the Committee on the Judiciary, 86th Cong. 1st Sess., "The Meaning of 'Writings' in the Copyright Clause of the Constitution," Copyright Law Revision Study No. 3 61. (Comm. Print 1960). This is by far the most thorough analysis and explanation of the scope of works covered by the Constitutional grant of copyright authority. See also Note, "Constitutional Limits on Copyright Protection", 68 Harv. L. Rev. 517 (1955).

15/ Committee debates at the Constitutional Convention were conducted in secret, and the available reports give no direct evidence of the scope of the Copyright and Patent Clause. The only published contemporary reference to the clause is contained in The Federalist, No. 43. Madison there stated:

> The utility of the powers will scarcely be questioned. The copyright of authors has been solemnly adjudged in Great Britain, to be a right of common law. The right to useful inventions seems with equal reason to belong to the inventors. The public good fully coincides in both cases with the claims of individuals. The State cannot separately make effectual provision for either of the cases, and most of them have anticipated the decision of this point, by laws passed at the instance of Congress. Id. at

16/ Act of May 31, 1790, ch. 15, 1 Stat. 124.

17/ Edison v. Lubin, 122 F. 240 (3d Cir. 1903); Metro-Goldwyn-Mayer Distributing Corp. v. Bijou Theatre Co., 3 F. Supp. 66 (D. Mass. 1933).

18/ Goldstein v. California, 412 U.S. 546 (1973).

an author's thoughts and ideas are given expressive form capable of being communicated, and therefore seem appropriate subject matter of copyright.

This is not to suggest that the scope of works eligible for copyright is not subject to constitutional constraint. Concern about such constraint was raised by a minority of the Supreme Court in Mazer v. Stein, 347 U.S. 201 (1954), in which copyright was upheld in a decorative statuette employed as a lamp base. Justice Douglas, joined by Justice Black, expressed the opinion that the case should be set for reargument to determine whether such decorative works were "writings" within the scope of the Constitution. Recognizing that the term "writings" had been broadly construed in several prior decisions, Justice Douglas nevertheless expressed doubt as to the inclusion in the constitutional class of statuettes and various other objects accepted for registration by the Copyright Office:

> Perhaps these are all "writings" in the Constitutional sense. But to me, at least, they are not obviously so. It is time that we come to the problem full face. I would accordingly put the case down for reargument. 347 U.S. at 221.

It would be safe to assume that these reservations concerning the constitutionality of copyright in a statuette would also apply to works expressed in the form of magnetic impulses, intended to be "comprehended" only by a machine, and serving the purely mechanical function of interacting with and directing a machine process.

III. Computer Object Programs Do Not Constitute "Writings" Under Applicable Constitutional Standards

Despite the flow of articles appearing over the past 12 years which

have advocated or assumed protection for computer software[19] -- to which there have been several notable exceptions[20] -- it can be argued that no sound analytical support exists for the contention that computer object programs are constitutionally entitled to copyright. A complete understanding of what constitutes a computer "object program" should precede any assessment of eligibility of such works for copyright.

Simply stated, a computer "object program" is created by processing[21] a source program with a compiler program. A source program is the direct creation of a computer programmer and sets forth, in any of a number of symbolic computer languages more or less akin to English, a series of instructions for directing a computer to perform certain operations. A compiler program, also the product of a programmer, is a kind of encoder, which mechanically transforms the symbolic language source program to produce an "object program", capable of interacting with a computer to direct the intended operations, and which may take the form of computer punch cards, electromagnetic impulses on tape or disc, layered circuitry in semiconductor

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19/ See, e.g., Lorr, "Copyright, Computers and Compulsory Licensing," 5 Rut. J. of Computers and Law 149 (1975); Comment, "Computer Program Protection: The Need to Legislate a Solution," 54 Corn. L. Rev. 586 (1969); Note, "Copyright Protection for Computer Programs," 64 Col. L. Rev. 1274 (1964).

20/ See Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs," 84 Harv. L. Rev. 281 (1970) [hereinafter cited as "Breyer"]; Note, "Computer Programs and Proposed Revisions of the Patent and Copyright Laws," 81 Harv. L. Rev. 1541 (1968); Henry, "Copyright: Its Adequacy in Technological Societies," 186 Science 993 (1974)

21/ The words "transforming" and "translating" are often employed in describing this process. The applicability of "translation," as used in copyright law, to an object program is mistaken. A translation is defined as a form of derivative work and must itself meet the constitutional requirement of a "writing" to be considered protectible. Nimmer on Copyright §40.

chips, or possibly other formats now unknown.[22/]

That the above-described source and compiler programs are the direct product of intellectual effort and constitute a form of writing is not here at issue. Object programs, also the result of intellectual achievement, have but one function and purpose: directing the step-by-step data processing operation of a computer to achieve a desired result by the application of computer power. As such, object programs are not intended to serve an inter-human communication function. Rather, they embody a set of mechanical directives which can "communicate," if at all, only with a machine. Such works, unquestionably the product of human intellectual effort, fall more appropriately within the domain of patent than copyright law. The policy justification for copyright -- to encourage the dissemination and interchange of human ideas expressed in literary and artistic form -- does not appear to be served by its extension to works which are designed to direct the operation of an electro-mechanical device.

A. Works of Solely Utilitarian Value Containing No Explanatory Information Are Not "Writings" Subject to Copyright

It is well established that the work product of human effort which consists merely of a system or method of accomplishing a functional task, or constitutes a wholly utilitarian part of a mechanical device, is not properly the subject of copyright. The argument has been made before this Commission that there may be an infinite variety of approaches to the creation of a complex computer program, and that any two programmers would design the steps embodied in a program intended to achieve the same result differently. While this

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22/ This description of various types of computer programs follows the testimony of Daniel McCracken given at the Commission meeting on November 18, 1976, and reproduced in the transcript of that meeting. Mr. McCracken's testimony will be cited several times in the course of this paper, infra, and will be referred to as "McCracken."

may be true, it may also be irrelevant to determining whether programs should be denied copyright. It appears that every programmer attempts to design a program according to his own concept of the most efficient means of accomplishing a predetermined task. The fact that any two individuals would design such a program differently reflects only the fact that any two people have different ideas about the best way of accomplishing a given task. This argument for considerating computer programs to be eligible for copyright, moreover, begs questions about the existence of any communicative function of such work, and about any conflict between patent and copyright. If computer object programs are considered utilitarian works embodying a system for accomplishing a predetermined mechanical task -- whether or not any two programmers would design differently programs for achieving the same results 23/ -- then they are not likely eligible for copyright.

That copyright should be denied utilitarian systems or methods, as distinguished from the manner in which such systems or methods are expressed, was recognized in the early case of Baker v. Selden, 101 U.S. 99 (1879). There it was held that the owner of copyright in a book describing an accounting system could not preclude others from adapting forms from those supplied in the book to employ the same system. The Supreme Court held that

> To give to the author of the book an exclusive property in the art described therein, when no examination of its novelty has ever been officially made, would be a surprise and a fraud upon the public. There is the province of leters-patent, not of copyright. 101 U.S. at 82.

The Court clearly recognized that a distinction existed between the form of expression employed to describe a utilitarian function, which could be protected by copyright, and the function or "art" itself, which could be protected only by

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23/ See notes 34-53 and accompanying text, infra.

patent. Nimmer has restated the holding of Baker v. Selden to be:

> Where the use of the "art" which a copyrighted work explains (or embodies) necessarily requires a copying of the work itself, then such copying will not constitute an infringement of copyright. However, if such copying occurs not in using the art but rather in explaining it, then such copying will constitute an infringement. 24/

Numerous cases have followed the reasoning of Baker v. Selden in denying copyright to works solely utilitarian in nature. In Taylor Instrument Co. v. Fawley-Brost Co., 139 F.2d 98 (7th Cir. 1943) copyright was denied a paper chart used in conjunction with a temperature recording device because

> the chart neither teaches nor explains the use of the art. It is an essential element of the machine; it is the art itself. 139 F.2d at 100.

The same result was reached by the United States Court of Appeals for the District of Columbia Circuit, which found a chart for recording temperature and pressure information to be ineligible for copyright in the case of Brown Instrument Co. v. Warner, 161 F.2d 910 (D.C. Cir. 1947). "Articles intended for practical use in cooperation with a machine," said the Court, "are not copyrightable." 161 F.2d at 911. The denial of copyright to forms and printed material having value only as the functional part of a mechanical process or method is a theme periodically appearing in copyright disputes. 25/

24/ Nimmer on Copyright §37.2 (1976).

25/ See, e.g., Vacheron and Constantin Le Coultre v. Benrus, 155 F. Supp. 932 (S.D.N.Y. 1957) (watch face, considered work of utility, held not copyrightable, design patent offers appropriate protection for such work); Time Saver Checks, Inc. v. DeLuxe Check Printers, Inc., 178 U.S.P.Q. 510 (N.D. Tex. 1973) (forms for checks are functional and therefore protectible, if at all, by patent rather than copyright).

The decision in Baker v. Selden has not been immune from criticism or varying interpretations. Nimmer says that the rationale of Baker v. Selden does not justify denial of copyrightability to any work, but rather that works designed for utilitarian function will be protected to the extent they contain copyrightable elements of expression, whether the work is exploited for its utilitarian or its explanatory value.[26/] This may be a reasonable formulation of the protection afforded by copyright to works describing systems and methods of accomplishing utilitarian functions. It fails to consider, however, works purely utilitarian which are devoid of expressive, descriptive elements, and are most accurately described or conceived as parts of a mechanical process. Those cases which have upheld copyright in works of primarily utilitarian value have likewise failed to consider works with solely utilitarian, as opposed to explanatory or descriptive, elements.[27/] For example, in a case involving the design of a table, it was held that the manufacture of a table from a copyrighted description

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26/ Nimmer on Copyright §37.31, §37.4.

27/ Several cases, for example, have upheld copyright in architectural plans, but held that, while copying the plans themselves could constitute infringement, the use of the ideas contained in the plans for construction of a building would not. Imperial Homes Corp. v. Lamont, 458 F.2d 895 (5th Cir. 1972); Herman Frankel v. Tegman, 367 F. Supp. 1051 (E.D. Mich. 1973). An earlier case had, however, acknowledged the possibility that unauthorized construction of a house could infringe copyrighted architectural plans. Scholz Homes v. Maddox, 379 F.2d 84 (6th Cir. 1964). The Court found that the plaintiff failed to prove access to its plans at the time the challenged house was built. The Court drew every possible inference in defendant's favor in order to reach that conclusion.

and design did not infringe copyright in the design.[28] Such designs, however, do manifest descriptive characteristics which are properly subject to copyright.

Courts have also interpreted the Baker v. Selden doctrine in ruling on the validity of copyright in such primarily utilitarian works as form books[29] and printed instructions for carrying on certain activities.[30] The varying approaches taken in these cases are not easily reduceable to a consistent, principled approach to determining the copyrightability of works intended to impart utilitarian knowledge. In the leading case of Morrissey v. Procter and Gamble Co., 379 F.2d 675 (1st Cir. 1967), copyright was denied a set of printed contest rules because the game defined by those rules could be described in only a limited number of ways, and the court feared that protecting the set of rules would in effect permit the game itself to be monopolized, in violation of the rule of Baker v. Selden.[31] In Continental Casualty Co. v. T.E. Beardsley, 253 F.2d 702 (2d Cir. 1958), however, copyright was upheld in a set of insurance forms, but the scope of protection was limited to protecting against nearly exact duplication of the explanatory materials contained

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28/ Clair v. Philadelphia Storage Battery, 43 F. Supp. 286 (E.D. Pa. 1941). The Court followed the reasoning of Baker v. Selden and stated that an idea of utilitarian value could not be protected by copyright. Id. at 288.

29/ Continental Casualty Co. v. Beardsley, 253 F.2d 702 (2d Cir. 1958); Miner v. Employers Mutual Liability Insurance Co., 229 F.2d 35 (D.C. Cir. 1956); E.K. Williams and Co., Inc. v. E.K. Williams and Co., 377 F. Supp. 418 (C.D. Cal. 1974); American Institute of Architects v. Fenichel, 41 F. Supp. 146 (S.D.N.Y. 1941); Aldrich v. Remington Rand, Inc., 52 F. Supp. 732 (N.D. Tex. 1942).

30/ Morrissey v. Procter and Gamble Co., 379 F.2d 675 (1st Cir. 1967); Borden v. General Motors Corp., 28 F. Supp. 330 (S.D.N.Y. 1939).

31/ Similar reasoning was apparently the basis for the denial of copyright to that portion of a sales instruction book setting out principles of salesmanship in Borden v. General Motors Corp., 28 F. Supp. 330 (S.D.N.Y. 1939).

in the set of forms because of their primarily utilitarian purpose.[32] Upon careful scrutiny, nevertheless, a consistent pattern does seem to emerge from the cases, consistent with that interpretation of Baker v. Selden distinguishing utilitarian systems from written material explaining their use: if the form in which a work appears is dictated solely by the need to accomplish a particular method or operation, the work is not copyrightable.[33] Corollary to that, the expressive form used to convey information describing a system or method of accomplishing a functional task may be copyrighted if copyright does not extend to the use of the method itself.

B. Computer Object Programs Communicate No Expressive Information to Entitle them to Copyright

As remarked earlier, the Supreme Court has provided only limited guidance in defining the dimensions of "Writings" eligible for copyright under the Constitution. Numerous courts, however, have recognized that an implicit component of such "Writings" is the capacity to communicate an author's expression. As the United States Court of Appeals for the Seventh Circuit said in denying copyright to a chart for recording temperature information, no case "has sustained a copyright upon an object which did not teach or convey information."[34] The capacity to convey or communicate information must

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32/ Cases have upheld copyright in form materials when they contained a significant amount of text. See, e.g., E.K. Williams and Co., Inc. v. E.K. Williams and Company, 377 F. Supp. 418 (C.D. Cal. 1974). And in at least one instance a court has avoided ruling on the copyrightability of forms by making a factual finding that no substantial copying was proven. Miner v. Employers Mutual Liability Ins. Co., 229 F.2d 35 (D.C. Cir. 1956).

33/ This rationale was explicitly adopted to deny copyright to playing cards containing point value enumerations for one system of bidding in bridge. Freedman v. Grolier Enterprises, 179 U.S.P.Q. 476 (S.D.N.Y. 1973).

34/ Taylor Instrument Co. v. Fawley-Brost Co., 139 F.2d 98, 100 (7th Cir. 1943). In denying copyright to a similar object, the United States Court of Appeals for the District of Columbia Circuit indicated that the charts there at issue were not "intended to communicate facts or ideas." Brown Instrument Co. v. Warner, 161 F.2d 910, 911 (D.C. Cir. 1947).

be manifested in a work to entitle it to copyright.[35/]

Yet it is precisely the element of communication of information in intelligible form that is lacking in computer object programs, whether existing as series of holes in computer punch cards, magnetic impulses on tape or discs, or fine silicon circuitry contained in a small chip. As was explained by Daniel McCracken, an object program is prepared by processing a source program, with the aid of a compiler, into a form which can operate a computer. Although McCracken indicated that "it is not impossible" for a trained person to interpret an object program, the resulting interpretation would merely approximate the function of the program, and the effort involved

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35/ In the case of White - Smith Music Pub. Co. v. Apollo Co., 209 U.S. 1 (1908), piano rolls used to perform music in conjunction with player pianos were held not to be "copies" of sheet music because they did not reproduce visually the musical notation. This holding was considered precedent for denying copyright protection to sound recordings on the ground that they were not within the scope of the Act of 1909. Capitol Records, Inc. v. Mercury Records Corp., 221 F.2d 657 (2d Cir. 1955). The enactment of the Sound Recording Act of 1972, Pub. L. 92-140, 85 Stat. 391, was thus required to entitle sound recordings to copyright. Implicit in the White - Smith and Capitol Records decisions is the determination that works without visually intelligible expression, although not included within the Act of 1909, might be constitutionally entitled to copyright. The holding of White-Smith was simply that a work of visual expression was not "copied" by the machine-produced aural expression of the music. Aural expression -- as in the actual rendition of music by piano rolls -- was thus excluded from copyright on statutory grounds. The fact that one skilled in the art might be able to interpret the music notation from the perforated piano rolls was found insufficient to satisfy the element of visible expression required to entitle the piano rolls to copyright. 209 U.S. at 18. Section 102 of the recently enacted Copyright Revision Bill makes clear that a work is to be entitled to copyright, regardless of whether a machine must be employed to manifest its expression. This overrules that interpretation of White-Smith which resulted in the denial of copyright to records, or presumably any other work which can be "produced" in tangible form only with the aid of a machine. The new statute, however, does not control the constitutional question of whether a work is a writing.

Also implicit in White - Smith and its progeny is recognition of the constitutional requirement that a work convey some intelligible impression to be entitled to copyright. Art objects, of course, do not communicate in written language. But, as a majority of the Supreme Court said in upholding copyright in a decorative statuette, albeit without acknowledging the constitutional issue, "Such expression, whether meticulously delineating the model or mental image or conveying the meaning by modernistic form or color, is copyrightable." Mazer v. Stein, 347 U.S. 201, 214 (1954). It is clear that the existence of some expression capable of being perceived by the sense for which it was intended is required to entitle a work to copyright under the Constitution.

would closely parallel the effort required to conceive the music notations represented by holes in a piano roll,[36] which in White - Smith, supra were held not to constitute a visual copy of sheet music notation.[37] And as McCracken also indicated, object programs are created to be used, not understood.[38]

It could be contended that copyright has been found valid for works not easily intelligible, such as books containing lists of words and phrases used as cable and telegraphic codes, notable for their utility rather than their art.[39] In one such instance, copyright was upheld in a code book containing sets of coined five letter words. Then - District Judge Learned Hand there went so far as to indicate that such a list of meaningless words were "writings" within the Constitution whether or not they communicate anything.[40] Actual communication, however, was not then and is not presently the applicable standard.

36/ The effort required to "interpet" such a program, as described by McCracken, would at best result only in "a rather good determination" of what the program does. McCracken, supra note 22 at 36-37.

37/ See note 35 supra.

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> If you want to do a text editing job, you don't have to understand this stuff [the object program] . . . . You don't have to understand how it works . . . . In fact, I couldn't tell you exactly what it does by looking at this with the aid of a device.

McCracken, supra note 22 at 23.

39/ Hartfield v. Peterson, 91 F.2d 998 (2d Cir. 1937); American Code Co., Inc. v. Bensinger, 282 F. 829 (2d Cir. 1922).

40/ Reiss v. National Quotation Bureau, 276 F. 717 (S.D.N.Y. 1921). There Judge Hand authored a long discourse on the constitutional requirements of copyright, the gist of which was that the failure of works of literary, pictorial or musical authorship to communicate ideas does not, ipso facto, deprive them of copyright:

> Not all words communicate ideas; some are mere spontaneous ejaculations. Some are used for their sound alone, like nursery jingles, or the rhymes of children in their play . . . . Conceivably there may arise a poet who strings together words without rational sequence - perhaps even coined

Judge Hand's words miss the mark when directed toward works which manifest no symbols capable of communication. The fact that words, or even code substitutes for words, may be used in ways that do not accomplish the communication of ideas obviously does not preclude a work from copyright. Nor would the lack of any quantifiable communication of ideas projected by a pictorial work preclude it from copyright. Communication depends equally on the recipient as on the initiator of any expression. All that is constitutionally required of a work to qualify as a "writing" eligible for copyright is that it be a work of human authorship both intended for and having a realizable potential of human communication, i.e. that it manifest the authorship of one person which can be perceived and experienced by another. Traditional works of literary authorship are, under this standard, eligible for copyright; ball bearings used in an automobile's steering mechanism are not.

While the distinction between works within and those without the constitutional grant may not always be clear, it must nevertheless always be drawn. In the words of Judge Hand, subject matter eligible for copyright "must have some relation to the grant." 41/ The subject matter represented by computer object programs does not appear to have that necessary relationship. Such

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> syllables -- through whose beauty, cadence, meter, and rhyme he may seek to make poetry. Music is not normally a representative art, yet it is a "writing. . . .
> . . . A pattern or an ornamental design depicts nothing; it merely pleases the eye. If such models or paintings are "writings", I can see no reason why words should not be because they communicate nothing. Id at 718-19.

41/ Id. at 719.

subject matter, rather, is more accurately perceived as an industrial product, potentially entitled to patent protection upon satisfaction of the statutory requirements of novelty, utility and nonobviousness.[42/] Certainly it is the policy justifying grants of patent -- to encourage invention in order to promote the general welfare --[43/] rather than that justifying copyright -- to encourage the production of literary and artistic work to promote the general welfare[44/] -- that would appear to apply to works the sole purpose of which is to operate a complex computer machine.

C. The Potential Eligibility of Computer Programs for Patent Protection as Processes or Machines Precludes their Eligibility for Copyright as a "Writing"

There appears to be no overlap between that subject matter eligible for copyright and that eligible for patent for inventions. While several courts have held that some overlap does exist between copyright and design patent,[45/] this overlap would not apply to process or apparatus patents. Design patents are authorized by statutory provisions separate from those authorizing patents for inventions,[46/] providing for a different term of

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42/ 35 U.S.C. §§101, 102 and 103.

43/ See Graham v. John Deere Co., 383 U.S. 1 (1966).

44/ See Mazer v. Stein, 347 U.S. 201, 219 (1954).

45/ See, e.g., Mazer v. Stein, 347 U.S. 201 (1954); Application of Yardley, 493 F.2d 1389 (C.C.P.A. 1974).

46/ 35 U.S.C. §171 provides:

> Whoever invents any new, original and useful design for an article of manufacture may obtain a patent therefor, subject to the conditions and requirements of this title.
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> The provisions of this title relating to patents for inventions shall apply to patents for designs, except as otherwise provided.

protection than that available for inventions,[47] and fulfilling a different purpose than that fulfilled by granting patents for a process or apparatus under 35 U.S.C. §101.[48] The potential eligibility of computer programs for patent as inventions under 35 U.S.C. §101 would preclude them from eligibility for copyright as "writings."

The question of patent protection for computer programs, much litigated in recent years, has not been resolved to the satisfaction of any party.[49] In two widely publicized cases, the Supreme Court has denied patent protection to computer programs. A process for converting machine-readable data from one numerical form to another to assist in computerized processing operations was held to be non-statutory subject matter in Gottschalk v. Benson, 409 U.S. 63 (1972), on the ground that the program represented the only meaningful expression of a mathematical relationship, and that granting a patent monopoly on the program would, in effect, grant a monopoly on a mathematical concept. In denying patentability to this program, the Court carefully refrained from barring all computer programs from patent:

> We do not hold that no process patent could ever qualify if it did not meet the requirements of our prior precedents. It is said that the decision precludes a patent for any program servicing a computer. We do not so hold. 409 U.S. at 71.

47/ 35 U.S.C. §173 provides:

> Patents for designs may be granted for the term of three years and six months, or for seven years, or for fourteen years, as the applicant, in his application, elects.

48/ The intent of the design patent is to encourage creative artistic activity. Application of Hruby, 373 F.2d 997 (C.C.P.A. 1967). As such, the constitutional justification for design patents would seem to sound in copyright rather than patent.

49/ See, e.g., Keeffe and Mahn, "Protecting Software: Is It Worth all the Trouble," 62 A.B.A.J. 906 (1976); Rich, "Change", 2 A.P.L.A.Q.J. 214 (1974).

In the past year, the Supreme Court also denied patent to a computer program in Dann v. Johnston, 425 U.S. 219 (1976). There at issue was a computer program, described as a "machine system", which controlled a general purpose computer to process bank records for individual customers. Denial of patent was based upon the failure of the applicant to demonstrate that the program was "nonobvious" to one skilled in the art, in satisfaction of the requirements of 35 U.S.C. §103.[50/] Fully aware of the distinction drawn by the Court of Customs and Patent Appeals between the program there at issue and the program denied patent in Gottschalk v. Benson, supra, the Dann Court nevertheless restricted its decision to the narrow ground of "obviousness." While the Court has evidently shown great reluctance to hold patents on computer programs valid, it has never indicated -- despite being presented with adequate opportunity -- that computer programs were generically ineligible for patent.

The eligibility of computer programs for patent has recently been reconfirmed in two cases decided by the Court of Customs and Patent Appeals. In Application of Chatfield, No. 76-551 (C.C.P.A. Nov. 18, 1976), a process patent was held valid in a computer program which controlled the operations of a multi-programmed computer system by assigning priorities to the various programs being run, thereby increasing the efficiency of the entire operation. And in Application of Noll, No. 74-541 (Nov. 18, 1976), patent in a computer system for converting signals in one format

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50/ In his opinion, Mr. Justice Marshall referred to previous utilization of automatic data processing systems to accomplish similar bank record processing tasks, and also to an earlier patented automatic data processing system for use in large business organizations which produced similar record processing results.

to another, which were then plotted on a cathode ray tube, was upheld. While the program was but one element of the entire apparatus for which patent was sought, it was clear that the program controlled the machine, and was the chief inventive element of the entire apparatus system.

In upholding these two patents, the majority of the court (both were decided by a 3-2 majority) paid careful attention to limits imposed on the patentability of computer programs by the Supreme Court's recent decisions in Gottschalk v. Benson, supra, and Dann v. Johnston, supra. Yet, unless one reads these cases to establish a complete bar to the patentability of computer programs -- a result entirely without explicit Supreme Court sanction -- one must conclude that those programs which do meet statutory criteria of novelty, utility and nonobviousness, and are not merely embodiments of a critical mathematical relationship, are entitled to patent. The results reached by the Court of Customs and Patent Appeals in Chatfield, supra, and Noll, supra, support this conclusion; they are not, however, necessary to it.

If it is accepted that computer programs are, upon compliance with the applicable statutory criteria, eligible for process or apparatus patents under 35 U.S. C. §101, it follows that they cannot also be eligible for copyright. By definition, a work eligible for patent as an invention under this statute is either a process or an apparatus. Equally by definition, neither a process nor an apparatus are eligible for copyright. Baker v. Selden, 101 U.S. 99 (1879). The fact that a work eligible for copyright may also be eligible for a design patent is irrelevant

to the mutual exclusivity of copyright and patents for invention.

This exclusivity has been acknowledged, both explicitly and implicitly, in numerous instances. In denying copyright protection to the bookkeeping system at issue in Baker v. Selden, supra, the Supreme Court stated:

> The description of the art in a book, though entitled to the benefit of copyright, lays no foundation for an exclusive claim to the art itself. The object of the one is explanation; the object of the other is use. The former may be secured by copyright. The latter can only be secured, if it can be secured at all, by letter-patent. 109 U.S. at 105.

In applying this rule to deny copyright in a chart employed as part of a mechanical device for plotting temperature in Taylor Instrument Co. v. Fawley-Brost Co., 139 F.2d 98 (7th Cir. 1943), the United States Court of Appeals for the Seventh Circuit analyzed the distinction between patent and copyright, and concluded that

> While it may be difficult to determine in which field protection must be sought, it is plain, so we think, that it must be in one or the other; it cannot be found in both. In other words, there is no overlapping territory, even though the line of separation may in some instances be difficult of exact ascertainment. 139 F.2d at 99.

This reasoning was further adopted by the United States Court of Appeals for the District of Columbia Circuit, which held in Brown Instrument Co. v. Warner, 161 F.2d 910 (D.C. Cir. 1947) that:

> Both law and policy forbid monopolizing a machine except within the comparatively narrow limits of the patent system . . . . Since the machines which cooperate with the charts in suit are useless without them, to copyright the charts would in effect continue appellant's monopoly of its machines beyond the time authorized by the patent law. 161 F.2d at 911.

There is no authority to refute this exclusivity. While Nimmer refers to "an overlapping area wherein certain works may claim either copyright or patent protection," 51/ the cases to which he refers in support of this contention all concern design patents. And the Supreme Court, in recognizing the overlap between design patents and copyright in Mazer v. Stein, 347 U.S. 201 (1954), also referred with apparent approval to the holdings of Taylor Instrument, supra, and Brown Instrument, supra, interpreting them to mean that "the Mechanical Patent Law and Copyright Laws are mutually exclusive." 347 U.S. at 215, n. 33. If computer programs constitute subject matter potentially eligible for invention patent, they would, accordingly, be ineligible for copyright.

That many programs would not qualify for patent protection, either for failure to satisfy the statutory requirements of novelty, utility or nonobviousness, as in Dann v. Johnston, supra, or for failure to constitute statutory subject matter, as in Gottschalk v. Benson, supra, does not, ipso facto, entitle them to protection under copyright. Such reasons for the denial of patent indicate only that a particular invention lacks sufficient amounts of the qualities necessary for patent, or, as in the case of Gottschalk v. Benson, represents a pure concept not entitled to patent. Such disqualification in no way changes the basic character of any computer program; and a pure concept is no more entitled to copyright than to patent. Programs may exist, as indicated by Daniel McCracken, as computer punch cards, magnetic discs, semiconductor

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51/ Nimmer on Copyright, §38 (1976).

chips, or be actually hardwired into the computer.[52] The perception of computer programs as machines, however, remain unchanged.[53]

IV. Conclusion

If computer object programs are, as suggested herein, utilitarian works designed solely to accomplish data processing tasks in conjunction with computers, embodying no expression capable of conveying intelligible information to human beings (except as a result of the rather contorted efforts involved in trying to comprehend a program's contents described by Daniel McCracken),[54] such works do not have the "relation to the grant" necessary to entitle them to copyright. The purpose and constitutional justification of copyright, long recognized as being to promote the progress of society by inducing the creation of literary and artistic works conveying some form of information to the members of the society, does not apply to computer programs. See Mazer v. Stein, 347 U.S. 201

52/ McCracken, supra note 22 at 33. As he there indicated, the decision as to the form in which a program will exist is based on considerations of time and cost efficiency.

53/ See Goetz. "Seen as Machine, Software Image May Improve," Computerworld (Dec. 13, 1976) at 24. The author there advocated software, he recognized for what it is -- one component of a complex machine system.

> In fact, software is a complex undertaking that very clearly parallels the building of hardware machines (or the hardware component of the computing machine). Id.

54/ McCracken, supra note 22 at 36-37.

(1954); United States v. Paramount Pictures, 334 U.S. 131 (1948).[55] Patent is designed to induce the creation of that type of work which manifests technological innovation and can be employed in such a way as to promote industrial development. See Taylor Instrument Co. v. Fawley-Brost, supra. Accordingly, computer object programs must fall on the patent side of the dividing line.

While it is true that committee reports accompanying the recently-enacted Copyright Revision do indicate an apparent congressional intention to include computer programs within the statute,[56] it is equally true that Congress has no authority to vest constitutional status where it would not otherwise exist. This is a proposition so much a part of our jurisprudence as to require little, if any, discussion. See Marbury v. Madison, 5 U.S. (1 Cranch) 137.

In this paper, it is not meant to contend that the creators of computer programs -- most of which will not likely satisfy the statutory

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55/ The argument that many copyrightable works are neither literary nor artistic in any meaningful sense -- such as telephone directories or maps -- is inapposite to arguing that computer programs should be copyrightable. These works, which clearly contain little, if any, material of "literary" value, nevertheless do impart some information in intelligible form. This has been considered sufficient to qualify them for copyright under the Constitution. The argument against considering computer object programs as "writings" is based solely on the lack of these very elements which, although serving rather mundane purposes and reflecting little artistic skill, nevertheless are found in telephone directories.

56/ S. Rep. 94-473, 94th Cong., 1st Sess. (1975), for example, states that

> Section 102(b) is intended, among other things, to make clear that the expression adopted by the programmer is the copyrightable element in a computer program . . . Id. at 54.

requirements for patent -- deserve no protection against unauthorized uses of their product. On the contrary, it is believed they do deserve and require such protection. Whether or not such need is met by the common law of trade secrecy and unfair competition is a question on which little quantitative evidence has been produced. Here it is only contended that protection for these works -- which can as easily exist as wired circuits in a machine as in magnetic impulses on a cassette tape -- does not fall within the grasp of copyright. Accordingly, the issue of protection for these works is beyond the jurisdiction of this Commission.